

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended) An unnecessary-film removal apparatus for supplying a chemical solution only to an unnecessary portion of a film formed on a surface of a substrate including a peripheral portion thereof to thereby remove the unnecessary-film portion ~~formed on the substrate, characterized by~~ comprising:

a substrate holding ~~means for~~ structure holding said substrate so as to allow in-plane rotation thereof;

a chemical solution supply ~~means for~~ member supplying said chemical solution;

a shield member covering the main surface of said substrate so as to form a constant clearance with respect to the main surface of said substrate in a removal area of the main surface of said substrate and form a space larger than said clearance in a non-removal area of the main surface of said substrate;

wherein:

said clearance ~~being~~ is set to a size that allows said chemical solution to enter said clearance ~~and but not to spread only in said clearance over said non-removal area;~~ and

a chemical solution guide member is located outside said shield member so as to form a flow path for said chemical solution cooperatively with said shield member;

wherein:

said chemical solution guide member has a configuration which covers at least a side surface of the substrate; and

said shield member and said chemical solution guide member ~~being~~ are disposed so as to be rotatable along with said substrate holding ~~means~~ structure.

2. (currently amended) ~~[[An]] The unnecessary-film removal apparatus according to claim 1 for supplying a chemical solution only to an unnecessary portion of a film formed on a surface of a substrate including a peripheral portion thereof to thereby remove the unnecessary-film portion, characterized by comprising;~~

~~substrate holding means for holding said substrate so as to allow in plane rotation thereof;~~

~~chemical solution supply means for supplying said chemical solution; and~~

~~a shield member covering the main surface of said substrate so as to form a constant clearance with respect to the main surface of said substrate in a removal area of the main surface of said substrate and form a space larger than said clearance in a non-removal area of the main surface of said substrate;~~

wherein:

said shield member ~~being~~ is provided with distance adjusting members that are three or more in number and that face the main surface of said substrate such that said clearance is set to a size that allows said chemical solution to enter said clearance ~~[[and]]~~ but not to spread only in said clearance over said non-removal area;

wherein:

arrangement positions of said distance adjusting members ~~being~~ are set such that, when said arrangement positions are connected to each other with a straight line, they are not located on the straight line and, when said shield member is rotated with respect to said substrate by a predetermined angle about the center of the surface of said substrate, they do not overlap the arrangement positions of said distance adjusting members positioned before rotation~~[[;]]~~

~~said shield member being disposed so as to be rotatable along with said substrate holding means.~~

3. (currently amended) ~~[[An]]~~ The unnecessary-film removal apparatus according to claim 1, for supplying a chemical solution only to an unnecessary portion of a film formed on a surface of a substrate including a peripheral portion thereof to thereby remove the unnecessary-film portion, characterized by comprising:

~~substrate holding means for holding said substrate so as to allow in plane rotation thereof;~~

~~chemical solution supply means for supplying said chemical solution; and~~

~~a shield member covering the main surface of said substrate so as to form a constant clearance with respect to the main surface of said substrate in a removal area of the main surface of said substrate and form a space larger than said clearance in a non-removal area of the main surface of said substrate;~~

wherein:

said shield member ~~being~~ is provided with distance adjusting members that are three or more in number and that face the main surface of said substrate such that said clearance is set to a size that allows said chemical solution to enter said clearance ~~[[and]]~~ but not to spread only in said clearance over said non-removal area; and

wherein:

arrangement positions of said distance adjusting members ~~being~~ are set such that, when said arrangement positions are connected to each other with a straight line, they are not located on the straight line;

a moving mechanism ~~being~~ is provided in which said distance adjusting members each move in parallel to a side direction of said substrate by a predetermined amount[[:]]

~~said shield member being disposed so as to be rotatable along with said substrate holding means.~~

4. (currently amended) ~~[[An]]~~ The unnecessary-film removal apparatus according to claim 1, for supplying a chemical solution only to an unnecessary portion of a film formed on a surface of a substrate including a peripheral portion thereof to thereby remove the unnecessary-film portion, characterized by comprising;

~~substrate holding means for holding said substrate so as to allow in-plane rotation thereof;~~

~~chemical solution supply means for supplying said chemical solution; and~~

~~a shield member covering the main surface of said substrate so as to form a constant clearance with respect to the main surface of said substrate in a removal area of the main surface of said substrate and to form a space larger than said clearance in a non-removal area of the main surface of said substrate, said clearance being set to a size that allows said chemical solution to enter said clearance and to spread only in said clearance;~~

wherein:

said substrate holding ~~means~~ having structure has a plurality of substrate holding members so as to hold said substrate at a plurality of positions on a bottom surface and side surfaces of said substrate;

wherein:

arrangement positions of said substrate holding ~~members being~~ units are set such that, when said substrate is rotated with respect to said substrate holding members by a predetermined angle, the arrangement positions of said substrate holding members do not overlap previous ones positioned before rotation[;]

~~said shield member being disposed so as to be rotatable along with said substrate holding means.~~

5. (currently amended) An unnecessary-film removal method using the unnecessary-film removal apparatus according to claim 1, ~~characterized by~~ comprising:

placing said substrate on said substrate holding ~~means~~ structure and

supplying the chemical solution from said chemical solution supply ~~means~~ member while integrally rotating said substrate, said shield member, and said chemical solution guide member so that the chemical solution is supplied only to the unnecessary portion of the film formed on the surface of said substrate including its peripheral portion through the flow path formed by said shield member and said chemical solution guide member, thereby removing the unnecessary film portion.

6. (currently amended) An unnecessary-film removal method using the unnecessary-film removal apparatus according to claim 2, ~~characterized by~~ comprising:

placing said substrate on said substrate holding ~~means~~ structure and

supplying the chemical solution from said chemical solution supply ~~means~~ member while integrally rotating said substrate ~~[[and]]~~, said shield member, and the chemical solution guide member so that the chemical solution is supplied only to the unnecessary portion of the film formed on the surface of said substrate including its peripheral portion ~~along an outer wall of said shield member~~ through a flow path formed between the shield member and the chemical solution guide member, thereby removing the unnecessary film portion, and thereafter, rotating said shield member with respect to said substrate by the predetermined angle about the center of the main surface of said substrate and removing the unnecessary film portion formed at positions where said distance adjusting members before rotation and said substrate were in contact with each other.

7. (currently amended) An unnecessary-film removal method using the unnecessary-film removal apparatus according to claim 3, ~~characterized by~~ comprising:

placing said substrate on said substrate holding members of said substrate holding ~~means~~ structure and

supplying the chemical solution from said chemical solution supply ~~means~~ member while integrally rotating said substrate, ~~[[and]]~~ said shield member, and said chemical solution guide member so that the chemical solution is supplied only to the unnecessary portion of the film formed on the surface of said substrate including its peripheral portion ~~along an outer wall of said shield member~~ through a flow path formed between the shield member and the chemical solution guide member, thereby removing the unnecessary film portion, and thereafter, rotating said substrate holding ~~means~~ structure with respect to said substrate by the predetermined angle about the center of the main surface of said substrate and removing the unnecessary film portion formed at positions where said substrate holding members before rotation and said substrate were in contact with each other.

8. (currently amended) A photomask blank manufacturing method ~~having a film forming process for~~ comprising:

forming a film such as an opaque film on an optically transparent substrate, ~~said photomask blank manufacturing method characterized by an unnecessary-film removal process for~~ and

removing from said film, an unnecessary film formed at an unnecessary portion ~~in said film-forming process,~~ by ~~the use of~~ the unnecessary-film removal method according to claim 5.

9. (new) A photomask blank manufacturing method, comprising:

preparing a mask blank having a resist film; and

removing the resist film formed on a peripheral portion of the mask blank, by the unnecessary-film removal method according to claim 5.

10. (new) The unnecessary-film removal apparatus according to claim 1, wherein:

the shield member has a side portion defined by an outer periphery inclined inwardly as the side portion is near to a bottom thereof.

11. (new) The unnecessary-film removal apparatus according to claim 1, wherein:

the shield member and the chemical solution guide member are fixed to each other by a connection member; and

the substrate holding member has a fixing member for positioning the substrate holding

structure, the shield member, and the chemical solution guide member so that they have an aligned center of rotation and integrally rotate together.

12. (new) The unnecessary-film removal apparatus according to claim 1, wherein:
a clearance adjusting member is provided on a bottom surface of a side portion of the shield member so as to adjust a clearance between the shield member and the principal surface of the substrate.

13. (new) The unnecessary-film removal apparatus according to claim 1, wherein:
the substrate is a mask blank and
the unnecessary film is a resist film.